Work Order ID 75639

October-27-11 11:40:50 AM

75639

Item ID: D6011-115

Accept *N900040100*

Setup **Start** *NS1* **Stop** *NS2*

Revision ID:

Item Name: Crosstube Material

Start Date: 27/10/2011 **Start Qty:** 20.00 *20*

Required Date: 28/06/2013 **Req'd Qty:** 20.00 *20*

Cust Item ID:

Customer:

Reference:

Run **Start** *NR1* **Stop** *NR2*

Approvals: **Process Plan:** M L J **Date:** 11/10/27 **Tooling:** ____ **Date:** ____

QC: ____ **Date:** ____ **SPC (Y/N):** ____ **Date:** ____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp

Draw Nbr	Revision Nbr
D6011	Rev A1

100 *100* Purchasing / Purchasing — PURCHASING — 0.00 — CL 11/11/03 20

Memo 0.00

Issue P/O: 15349 a) Order as per Dwg D6011b) Material: 2.750 x 0.650 wall 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9 or QQ-A-200/11) seamless aluminum tube c) Minimum ultimate tensile strength = 77 ksi d) Minimum tensile yield strength = 66 ksi

110 *110* Packaging / Packaging — Receive & Inspect for Damage & Mat'l Certs — 0.00 — 13/3/28 23

Memo 0.00

Ensure material certification is attached

120 *120* QC / Quality Control — QC6- Inspect dimensions to drawing — 0.00

Memo 0.00 DA 16 Blr log

Ensure Material certification comply to Dwg

see extrusion inspection sheet attached

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 75639

October-27-11 11:40:51 AM

75639

Item ID: D6011-115 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Material

Start Date: 27/10/2011 **Start Qty:** 20.00 *20*

Required Date: 28/06/2013 **Req'd Qty:** 20.00 *20*

Reference:

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Chemical Conversion Coat per QSI005-4.1	0.00							
130									
HandFinish	**Memo**	0.00							
Hand Finishing	n/a								
140	Identify as per dwg & Stock Location: L/6	0.00							
140						1	Ø		
Packaging	**Memo**	0.00							
Packaging									
						amm.c 13/05/08			
150	QC21- Final Inspection - Work Order Release	0.00							
150									
QC	**Memo**	0.00							
Quality Control						MC 13-05-08			

pl 13-05-8

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

October-27-11 11:40:55 AM

Work Order ID: 75639

75639

Parent Item: D6011-115

D6011-115

Parent Item Name: Crosstube Material

Start Date: 27/10/2011 **Required Date:** 28/06/2013

Start Qty: 20.00 **Required Qty:** 20.00

Comments: IPP Rev:A01.08.17New IssueSM
IPP rev B 07.09.18 rev A1 dwg EC verified by:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6011-115P		Purchased	No			100	Each	0.0000	1	20			
D6011-115P									**				
Crosstube Material													

43/3/22

03

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

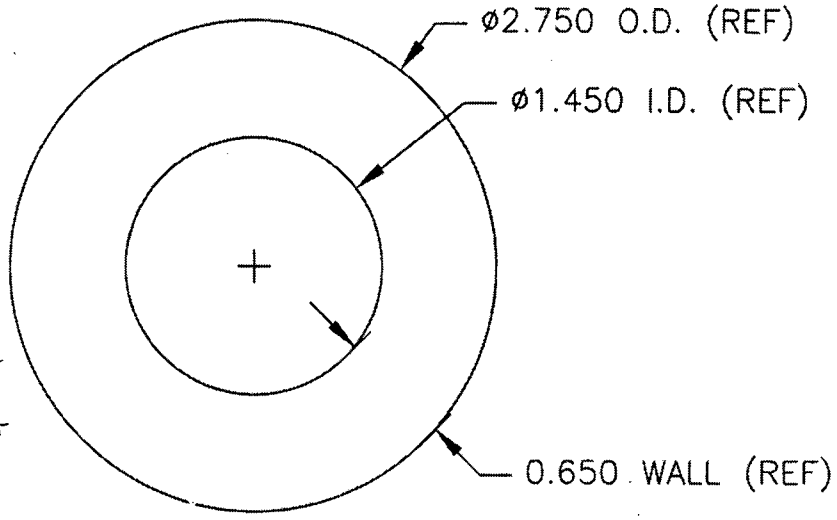
DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D6011	REV. A SHEET 1 OF 1
DATE 01.08.16		TITLE CROSSTUBE MATERIAL	SCALE 1:1

A	01.08.16	NEW ISSUE
A1	RT 02-01-29	UPDATE TOLERANCE ON OD.

SPECIFICATION CONTROL DRAWING

RELEASED
01.08.17

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 75639 M.C.J
11/10/27



NOTES

1) D6011–XXX CROSSTUBE
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 115" LONG TUBE: D6011–115

2) MATERIAL: 2.750 OD x 0.650 WALL 7075–T6/T6511 (WW–T–700/7 OR QQ–A–225/9 OR QQ–A–200/11) SEAMLESS ALUMINUM TUBE.
MINIMUM ULTIMATE TENSILE STRENGTH = 77 ksi
MINIMUM YIELD TENSILE STRENGTH = 66 ksi

3) TOLERANCES ARE PER ~~ASTM B210 AS FOLLOWS:~~ ANSI H35.2 AS FOLLOWS A1
O.D.: ~~± 0.006 MEAN (±0.012 INCLUDING OVALITY)~~ ±0.015 MEAN (±0.030 INCL. OVALITY)
WALL: ±0.020 MEAN (±0.065 INCLUDING ECCENTRICITY)
LENGTH: XXX +0.125/–0.000
STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH

4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

5) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART aerospace
Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO15349

Purchase Order Date 11/03/11
PO Print Date 12/07/11

Order From : VU-ALU001

ALUMINIUMWERK UNNA AG
630 3033 SOUTH PARKER RD
AURORA, CO 80014
USA

Contact Name		**Buyer**	Chantal Lavoie
Vendor Phone	303 755 5672	**Requisition Nbr**	
Vendor Fax	303 755 5936	**Tax Resale Nbr**	10127-2607
Vendor Account Nbr		**Terms**	Net 30
		Currency	USD
		FOB	Destination-Collect

Ship To : DART AEROSPACE LTD 1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

REVISED

Line Nbr	Reference / Revision ID / Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	Req Qty/ Unit of Measure	Ship Method	Unit Price	Extended Price
1	D6011-115P	Crosstube Material	3/28/13 Yes	20.00 Each		$697.0000	$13,940.00

NEC 23 / 13/3/28

Special Inst: AS PER DWG D6011 REV. A
B75639
MATERIAL: 7075-T6/T6511 AS PER WW-T-700/7 OR
QQ-A-200/11 OR QQ-A-225/9 SEAMLESS TUBE
MINIMUM ULTIMATE TENSILE STRENGTH = 77 KSI
MINIMUM TENSILE YIELD STRENGTH = 66 KSI
SIZE: 2.750" OD X 0.650" WALL X 115" LONG

PO Total: **$13,940.00**

CL

No substitution or deviation without consent.
Certificate of Conformity or Material Certification required when applicable

Change Nbr: 3 **Change Date:** 12/07/11

ALUnna

Packinglist ALUnna AG

ALUnna ref. no.	44992/100
Customer PO.	Po. 15349
Date:	02.18.13

Boxmarking:

Dart Aerospace Po. 15349
D6011-115
Made in Germany Dest.: Hawkesbury Ont, Canada

We hereby declare that the wooden packing material are totally free from bark and apparently free from live plant pests

Item no.	Box no.	OD (inch)	ID (inch)	Wall (inch)	Net Weight (lbs)	Tare lbs	Gross Weight	Pieces	lengths (ft)	Boxdimension Lengths (inch)	Width (inch)	height (inch)	Cast. / Heat No. Top	Pcs.	Cast. / Heat No. Middle	Pcs.	Cast. / Heat No. Bottom
100	1	2,750	1,450	0,650	1153	246	1399	23	9,583	151,575	22,441	22,441			84239/1401514	23	
					1153	246	1399	23				1,251 m³					

S:\VERSAND\USA_Packliste\44992_100

Abnahmeprüfzeugnis 3.1 - DIN EN 10204:2005

Inspection Certificate 3.1 - DIN EN 10204:2005 / Certificat de Reception 3.1- DIN EN 10204:2005

Kunde: *Client:* Dart Aerospace Ltd.

1270 Aberdeen Street
K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: *Cert No.: / No. du certificat:* 182/13

Bestellnummer: *Order No. / No. de commande* PO 15349

Produkt: *Product / Produit:* Rohre nahtlos gepresst / *Tubes seamless extruded*

Auftrag: *Our Reference/Notre Reference:* 44992/100

Spezifikation: *Specification:* AMS - QQ - A - 200/11; Spezifikation Dart Aerospace D6011

Werkstoff: *Alloy/Alliage:* 7075

Zustand: *Temper/État* T 6511

Abmessung *Size / Dimension* 2,750 INCH x 1,450 INCH x 0,650 INCH x 115,00 INCH
buff finish

Kennzeichnung *Marking/Marquage:* CERT. NO. 182/13 - ALUnna - 7075 - T6511 - CAST NO. 84239 - AMS - QQ - A - 200/11 - 2.750" OD X 0.625" WALL - HEAT LOT NO. 1401514 - ALUNNA ORDER CONF. NO. 44992/100-1 - P.O. 15349

Lieferung *Delivered Material / Matérial délivre:*

	pcs.	lbs
	23	1153

Country of Manufacture: Germany
Products are in accordance with applicable RoHS

1. Chemische Analyse — *Chemical Analysis / analyse chimique*

Other elements each max. 0,05 %, total 0,15 %

Charge/ Cast No.		Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni
	min.			1,2		2,1	0,18	5,1						
	max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20					
84239		0,08	0,16	1,51	0,04	2,46	0,18	5,71	0,04	0,01	0,03			0,0001

Hydrogen content: 0,08 **ccm/100 g Al** Elements without indication < 0,01 % **country of melt manufacturer: Germany**

2. Mechanische Eigenschaften — *Mechanical Properties / Valeurs Mécaniques*

Anforderungen Requirements		tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat Lot No.
	min.	77,0	66,0	7,0			
	max.						
1		88,450	81,780	10,0			1401514
2		87,000	80,185	10,0			

S13/05/07

RMS outside 25 - max. 18,0 µ"

Ergebnis der Prüfungen: Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results: We confirm that the delivery has been tested and applies to the agreements made on receipt of the order

Resultats: Nous confirmons que la livraison a été controlée et correspond avec les conventions faites à la réception de la commande

mergardtn

07.02.2013

Certified acc. DIN EN ISO 9001:2008 and DIN EN 9100:2003
valid until 2013-11-10
Cert.- Reg. No.: 001959 QM08; 001959 ASH

ALUnna

Abnahmebeauftragter

EXTRUSION INSPECTION SHEET

		SIDE A	SIDE B					ULTRA SONIC MEASURMENTS				
TUBE #	TOTAL LENGTH	DIA two readings	DIA two readings	INSIDE DIA	wall thickness measured w/vern	Strightness at 12"in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4
DWG	115.00"	2.750"		1.450"	0.650"	0.010"	N/A	Middle	N/A			
1	115.00"	2.756"/2.751"	2.755"/2.753"	1.448"	0.649"/0.658"	0.005"	N/A	Middle	0.656"	0.647"	0.643"	0.660"
2	115.00"	2.756"/2.742"	2.755"/2.749"	1.445"	0.651"/0.636"	0.004"	N/A	Middle	0.649"	0.640"	0.657"	0.656"
3	115.00"	2.753"/2.751"	2.753"/2.749"	1.447"	0.668"/0.643"	0.0055"	N/A	Middle	0.644"	0.660"	0.654"	0.645"
4	115.00"	2.756"/2.753"	2.755"/2.749"	1.446"	0.646"/0.642"	0.0045"	N/A	Middle	0.656"	0.664"	0.648"	0.631"
5	115.00"	2.756"/2.753"	2.757"/2.753"	1.447"	0.660"/0.651"	0.006"	N/A	Middle	0.657"	0.653"	0.645"	0.643"
6	115.00"	2.753"/2.746"	2.753"/2.744"	1.447"	0.659"/0.646"	0.0075"	N/A	Middle	0.655"	0.661"	0.649"	0.635"
7	115.00"	2.756"/2.751"	2.754"/2.753"	1.441"	0.654"/0.639"	0.007"	N/A	Middle	0.643"	0.638"	0.663"	0.660"
8	115.00"	2.752"/2.748"	2.752"/2.747"	1.447"	0.659"/0.648"	0.0075"	N/A	Middle	0.659"	0.656"	0.644"	0.643"
9	115.00"	2.756"/2.754"	2.756"/2.752"	1.443"	0.660"/0.642"	0.004"	N/A	Middle	0.639"	0.649"	0.666"	0.653"
10							N/A	Middle				
11							N/A	Middle				
12							N/A	Middle				
13							N/A	Middle				
14							N/A	Middle				
15							N/A	Middle				
PART # D6011-115		P/O# 15349			BATCH # B75639			Notes:				

MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 side A

Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.756	2.751	2.754	2.750	0.006	2.744	2.756	0.009	-0.002
2	2.756	2.742	2.749	2.750	0.006	2.744	2.756	0.005	-0.007
3	2.753	2.751	2.752	2.750	0.006	2.744	2.756	0.008	-0.004
4	2.756	2.753	2.755	2.750	0.006	2.744	2.756	0.011	-0.001
5	2.756	2.753	2.755	2.750	0.006	2.744	2.756	0.011	-0.001
6	2.753	2.756	2.755	2.750	0.006	2.744	2.756	0.011	-0.001
7	2.756	2.751	2.754	2.750	0.006	2.744	2.756	0.009	-0.002
8	2.752	2.748	2.750	2.750	0.006	2.744	2.756	0.006	-0.006
9	2.756	2.754	2.755	2.750	0.006	2.744	2.756	0.011	-0.001
10			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 Side B

Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.755	2.753	2.754	2.750	0.006	2.744	2.756	0.010	-0.002
2	2.755	2.749	2.752	2.750	0.006	2.744	2.756	0.008	-0.004
3	2.753	2.749	2.751	2.750	0.006	2.744	2.756	0.007	-0.005
4	2.755	2.749	2.752	2.750	0.006	2.744	2.756	0.008	-0.004
5	2.757	2.753	2.755	2.750	0.006	2.744	2.756	0.011	-0.001
6	2.753	2.744	2.749	2.750	0.006	2.744	2.756	0.004	-0.007
7	2.754	2.753	2.754	2.750	0.006	2.744	2.756	0.009	-0.002
8	2.752	2.747	2.750	2.750	0.006	2.744	2.756	0.005	-0.006
9	2.756	2.752	2.754	2.750	0.006	2.744	2.756	0.010	-0.002
10			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A

Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
2	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
3	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
4	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
5	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
6	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
7	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
8	2.752	2.750	0.012	2.738	2.762	0.014	-0.010
9	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
10			0.012	-0.012	0.012	0.012	-0.012
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b

Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.755	2.750	0.012	2.738	2.762	0.017	-0.007
2	2.755	2.750	0.012	2.738	2.762	0.017	-0.007
3	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
4	2.755	2.750	0.012	2.738	2.762	0.017	-0.007
5	2.757	2.750	0.012	2.738	2.762	0.019	-0.005
6	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
7	2.754	2.750	0.012	2.738	2.762	0.016	-0.008
8	2.752	2.750	0.012	2.738	2.762	0.014	-0.010
9	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
10			0.012	-0.012	0.012	0.012	-0.012
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A

Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
2	2.742	2.750	0.012	2.738	2.762	0.004	-0.020
3	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
4	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
5	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
6	2.756	2.750	0.012	2.738	2.762	0.018	-0.006
7	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
8	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
9	2.754	2.750	0.012	2.738	2.762	0.016	-0.008
10			0.012	-0.012	0.012	0.012	-0.012
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b

Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
2	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
3	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
4	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
5	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
6	2.744	2.750	0.012	2.738	2.762	0.006	-0.018
7	2.753	2.750	0.012	2.738	2.762	0.015	-0.009
8	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
9	2.752	2.750	0.012	2.738	2.762	0.014	-0.010
10			0.012	-0.012	0.012	0.012	-0.012
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

end measuement with vern

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	Actual A	Actual B	Mean	Nominal	Tolerance	min	max	min	max
1	**0.649**	**0.658**	**0.654**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0185**	**-0.012**
2	**0.651**	**0.636**	**0.644**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0085**	**-0.022**
3	**0.668**	**0.643**	**0.656**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0205**	**-0.010**
4	**0.646**	**0.642**	**0.644**	**0.650**	**0.015**	**0.635**	**0.665**	**0.009**	**-0.021**
5	**0.660**	**0.651**	**0.656**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0205**	**-0.010**
6	**0.659**	**0.646**	**0.653**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0175**	**-0.013**
7	**0.654**	**0.639**	**0.647**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0115**	**-0.019**
8	**0.659**	**0.648**	**0.654**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0185**	**-0.012**
9	**0.660**	**0.642**	**0.651**	**0.650**	**0.015**	**0.635**	**0.665**	**0.016**	**-0.014**
10			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	Actual A	Actual B	Nominal	Tolerance	min	max	min	max
1	**0.649**	**0.658**	**0.650**	**0.038**	**0.612**	**0.688**	**0.037**	**-0.030**
2	**0.651**	**0.636**	**0.650**	**0.038**	**0.612**	**0.688**	**0.039**	**-0.052**
3	**0.668**	**0.643**	**0.650**	**0.038**	**0.612**	**0.688**	**0.056**	**-0.045**
4	**0.646**	**0.642**	**0.650**	**0.038**	**0.612**	**0.688**	**0.034**	**-0.046**
5	**0.660**	**0.651**	**0.650**	**0.038**	**0.612**	**0.688**	**0.048**	**-0.037**
6	**0.659**	**0.646**	**0.650**	**0.038**	**0.612**	**0.688**	**0.047**	**-0.042**
7	**0.654**	**0.639**	**0.650**	**0.038**	**0.612**	**0.688**	**0.042**	**-0.049**
8	**0.659**	**0.648**	**0.650**	**0.038**	**0.612**	**0.688**	**0.047**	**-0.040**
9	**0.660**	**0.642**	**0.650**	**0.038**	**0.612**	**0.688**	**0.048**	**-0.046**
10				0.038	-0.038	0.038	0.038	-0.038
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038

center measurment with ultra sonic

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	highest	lowest	Mean	Nominal	Tolerance	min	max	min	max
1	**0.660**	**0.643**	**0.652**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0165**	**-0.014**
2	**0.657**	**0.640**	**0.649**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0135**	**-0.017**
3	**0.660**	**0.644**	**0.652**	**0.650**	**0.015**	**0.635**	**0.665**	**0.017**	**-0.013**
4	**0.664**	**0.631**	**0.648**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0125**	**-0.018**
5	**0.657**	**0.643**	**0.650**	**0.650**	**0.015**	**0.635**	**0.665**	**0.015**	**-0.015**
6	**0.661**	**0.635**	**0.648**	**0.650**	**0.015**	**0.635**	**0.665**	**0.013**	**-0.017**
7	**0.663**	**0.638**	**0.651**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0155**	**-0.015**
8	**0.659**	**0.643**	**0.651**	**0.650**	**0.015**	**0.635**	**0.665**	**0.016**	**-0.014**
9	**0.666**	**0.639**	**0.653**	**0.650**	**0.015**	**0.635**	**0.665**	**0.0175**	**-0.013**
10			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	highest	lowest	Nominal	Tolerance	min	max	min	max
1	**0.660**	**0.643**	**0.650**	**0.038**	**0.612**	**0.688**	**0.048**	**-0.045**
2	**0.657**	**0.640**	**0.650**	**0.038**	**0.612**	**0.688**	**0.045**	**-0.048**
3	**0.660**	**0.644**	**0.650**	**0.038**	**0.612**	**0.688**	**0.048**	**-0.044**
4	**0.664**	**0.631**	**0.650**	**0.038**	**0.612**	**0.688**	**0.052**	**-0.057**
5	**0.657**	**0.643**	**0.650**	**0.038**	**0.612**	**0.688**	**0.045**	**-0.045**
6	**0.661**	**0.635**	**0.650**	**0.038**	**0.612**	**0.688**	**0.049**	**-0.053**
7	**0.663**	**0.638**	**0.650**	**0.038**	**0.612**	**0.688**	**0.051**	**-0.050**
8	**0.659**	**0.643**	**0.650**	**0.038**	**0.612**	**0.688**	**0.047**	**-0.045**
9	**0.666**	**0.639**	**0.650**	**0.038**	**0.612**	**0.688**	**0.054**	**-0.049**
10				0.038	-0.038	0.038	0.038	-0.038
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038